

DETAILED ACTION

This Office Action is in response to the Applicants' communication filed on 28 September 2006, the preliminary amendment concurrently filed therewith, and the telephone interview held on 03/23/2009. In virtue of these communications, Claims 1-17 are currently pending in the instant application, wherein Claims 1-13 and 16-17 of Invention Group I are elected for prosecution on the merits, and Claims 14-15 of Invention Group II have been withdrawn from consideration (SEE BELOW).

Election/Restrictions

Restriction Requirement for 35 U.S.C. 371 Cases

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Two Groups of Claims arranged by Examiner are as follows:

- Group I, claims 1-13 and 16-17, drawn to a projection module.
- Group II, claims 14-15, drawn to an optical motor.

2. The Groups of inventions listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

- Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of a module comprising an objective which comprises means for emitting an imaging beam, a curved mirror, and at least two deflection surfaces for deflecting said imaging beam, wherein these surfaces are placed in the path of said imaging beam between said objective and said curved mirror, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of Suzuki (EP 1 203 977 A1).

- Prior Art Suzuki (EP 1 203 977 A1) teaches a module comprising an objective which comprises means for emitting an imaging beam, a curved mirror, and at least two deflection surfaces for deflecting said imaging beam, these surfaces being placed in the path of said imaging beam between said objective and said curved mirror (see Fig. 25).

Communication with Applicant's Representative

3. During a telephone conversation with Ms. Patricia Verlangieri on Wednesday, March 25, 2009 a provisional election was made without traverse to prosecute the invention of Group I including Claims 1-13 and 16-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-15 included in Group II are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

4. Receipt is acknowledged of papers submitted by the international office under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Disclosure Objections

Abstract Objections

5. Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said,"

should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to as improper because it fails to comply with the guidelines for abstracts in United States patent applications as set forth in MPEP § 608.01(b). Correction is required.

Specification Objections

7. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings Objections

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 24-25 (see Fig. 2), h2-h3 and p2 (see Fig. 3), 50 (see Fig. 5), h"1-h"3 and $\alpha 1-\beta 1$ (see Figs. 10-11), 140 (see Fig. 14), and 170-172 (see Fig. 17). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing

on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

9. Claim 16 is objected to because of the following informalities: “wherein it” (Line 2) should be replaced with --which--; “13” in line 3 should be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 6-8, 10-11, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (EP 1 203 977 A1).

With respect to Claims 1 and 16, Suzuki et al. discloses, in Fig. 25, a projection module intended to project an image on a screen (18) defining a specified projection plane, said module

comprising an objective (11, termed an “illumination light”, which is not shown in this figure [see Fig. 3]) which comprises means for emitting an imaging beam, a curved mirror (60, termed a “convex mirror”), and at least two deflection surfaces (59, termed a “path-bending reflector”, and 14, termed a “micro-mirror device”) for deflecting said imaging beam (the deflection elements direct by deflection the imaging beam from the objective to the curved mirror) wherein these surfaces are placed in the path of said imaging beam (see Fig. 25) between said objective (11) and said curved mirror (60).

With respect to Claim 6, Suzuki et al. further discloses, in Fig. 25, that at least one of said deflection surfaces (specifically 59, termed a “path-bending reflector”) is designed to redirect the imaging beam coming from the objective onto the curved mirror (60, termed a “convex mirror”) in a plane perpendicular to said projection plane (61, which is defined as the horizontal optical axis of 60).

With respect to Claim 7, Suzuki et al. further discloses, in Fig. 25, that at least one of said deflection surfaces (specifically 59, termed a “path-bending reflector”) makes an angle of between 40° and 50° with a plane normal to said projection plane (partially delineated by 61, which is defined as the horizontal optical axis of 60).

With respect to Claim 8, Suzuki et al. further discloses, in Fig. 25, that the deflection surfaces are plane surfaces (59 and 14; see Fig. 25 for geometric representations of the deflection surfaces).

With respect to Claim 10, Suzuki et al. further discloses, in Fig. 25, that the curved mirror (60) is at least partly convex (termed a “convex mirror”).

With respect to Claim 11, Suzuki et al. further discloses, in Fig. 25, that the curved mirror (60) is convex (termed a “convex mirror”).

With respect to Claim 17, Suzuki et al. discloses that it (or the projection system) comprises a projection screen (18) and wherein said module illuminates said screen via the rear (see Fig. 25 of Suzuki et al.).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 2 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (EP 1 203 977 A1) in view of Bassi et al. (Pub. No.: US 2003/0231261 A1).

With respect to Claim 2, Suzuki et al. discloses, as cited above, all limitations of Claim 1. Suzuki et al. does not teach that the curved mirror is a hyperbolic mirror.

Bassi et al. discloses, in Fig. 11, a rear projection television system comprising a hyperbolic curved mirror (123, termed a “second mirror”; see Page 7, [0077], Lines 1-3) for receiving an imaging beam from deflection mirror (121, termed a “first mirror”).

It would have been obvious to one of ordinary skill in the art at the time of invention to replace the convex curved mirror of Suzuki et al. with a hyperbolic curved mirror as taught by Bassi et al., resulting in a projector system comprising an objective, a hyperbolic mirror, and at least two deflection surfaces between the two, to predictably provide a panoramic view of the images displayed to the viewer.

With respect to Claim 12, Suzuki et al. discloses, as above, all limitations of Claim 1. Suzuki et al. does not teach that the curved mirror is at least partly concave.

Bassi et al. discloses, in Fig. 11, a rear projection television system comprising a hyperbolic, at least partly concave, curved mirror (123, termed a “second mirror”; see Page 7,

[0077], Lines 1-3) for receiving an imaging beam from deflection mirror (121, termed a “first mirror”).

It would have been obvious to one of ordinary skill in the art at the time of invention to replace the convex curved mirror of Suzuki et al. with a hyperbolic, partly concave, curved mirror as taught by Bassi et al., resulting in a projector system comprising an objective, a partly concave hyperbolic mirror, and at least two deflection surfaces between the two, to predictably provide a real image on the screen and a panoramic view of the images displayed to the viewer.

With respect to Claim 13, the combination of Suzuki et al. and Bassi et al., as cited with respect to Claim 12, disclose, in Fig. 11 of Bassi et al., that said curved mirror (123, termed a “second mirror”) is concave (see Page 7, [0077], Lines 1-3).

15. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (EP 1 203 977 A1) in view of Burstyn (U.S. Patent No. 6,406,150 B1).

With respect to Claim 3, Suzuki et al. discloses, in Fig. 25, all limitations of Claim 1 further including that the objective is disposed in the open space below the optical system shown (see Page 29, [0355], Lines 8-9).

Suzuki et al. does not explicitly teach that the angle between the axis of said objective and said projection plane does not exceed 10°.

Burstyn discloses, in Fig. 1, arranging the objective (24, termed a “projector”) such that the axis of the objective and the projection plane does not exceed 10° (see Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of invention to arrange the objective of Suzuki such that the angle between the axis of said objective and said projection plane does not exceed 10°, as taught by Burstyn, to optimize the size of the unit by compacting the rear projection system while maintaining optimal sharpness and brightness of the projected image (see Burstyn, Col. 1, Lines 57-60).

With respect to Claim 4, Suzuki et al. discloses, in Fig. 25, all limitations of Claim 1 further including that the objective is disposed in the open space below the optical system shown (see Page 29, [0355], Lines 8-9).

Suzuki et al. does not explicitly teach that the projected image is rectangular or that the angle between the axis of said objective and the long side of the image projected on said screen does not exceed 10°.

Burstyn discloses, in Fig. 1, that the projected image is rectangular and further discloses arranging objective (24, termed a “projector”) such that the angle between the axis of said objective and the long side of the image projected on said screen does not exceed 10° (see Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of invention to arrange the objective of Suzuki such that the angle between the axis of said objective and said projection plane does not exceed 10°, as taught by Burstyn, to optimize the size of the unit by

compacting the rear projection system while maintaining optimal sharpness and brightness of the projected image (see Burstyn, Col. 1, Lines 57-60).

With respect to Claim 5, Suzuki et al. discloses, in Fig. 25, all limitations of Claim 1 further including that the objective is disposed in the open space below the optical system shown (see Page 29, [0355], Lines 8-9).

Suzuki et al. does not explicitly teach that the projected image is rectangular or that the angle between the axis of said objective and the short side of the image projected on said screen does not exceed 25°.

Burstyn discloses, in Fig. 1, that the projected image is rectangular and further discloses arranging objective (24, termed a “projector”) such that the angle between the axis of said objective and the short side of the image projected on said screen does not exceed 25° (see Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of invention to arrange the objective of Suzuki such that the angle between the axis of said objective and said projection plane does not exceed 10°, as taught by Burstyn, to optimize the size of the unit by compacting the rear projection system while maintaining optimal sharpness and brightness of the projected image (see Burstyn, Col. 1, Lines 57-60).

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (EP 1 203 977 A1) in view of Flasck (U.S. Patent No. 5,108,172 A).

With respect to Claim 9, Suzuki et al. discloses all limitations of Claim 1, as cited above.

Suzuki et al. does not teach that the optical system includes at least one mask associated with at least one of said deflection surfaces and designed to prevent the propagation of parasitic rays.

Flasck discloses, in the Fig. 16, at least one mask (196, termed a “scatter mask”), associated with a deflector (184, termed a “first surface mirror”), which is designed to prevent the propagation of parasitic rays (scattered light rays which interfere with the integrity of the optical system).

It would have been obvious to one of ordinary skill in the art at the time of invention to supplement the projection system of Suzuki et al. with the scatter mask taught by Flasck, such that the mask was arranged in association with the deflection surfaces as to prevent parasitic ray propagation due to light scatter off the optical components, to predictably improve the contrast and image quality of the projection.

Citation of Relevant Prior Art

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Prior Art Sakata et al. (Pub. No.: US 2003/0011753) teaches a rear projection optical system with an objective, a plurality of deflection surfaces, and a concave curved mirror;

- Prior Art Hisada et al. (U.S. Patent No. 7,467,872 B2) teaches a rear projection optical system with an objective, a plurality of deflection surfaces, and a partially concave curved mirror and a convex curved mirror; and
- Prior Art Masubuchi et al. (U.S. Patent No. 7,503,661 B2) teaches a rear projection optical system with an objective, a plurality of deflection surfaces, and a convex curved mirror.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jori S. Byrne-Diakun whose telephone number is (571) 270-7555. The examiner can normally be reached on 7:30 AM to 5 PM EST, Monday thru Friday with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thuy V. Tran can be reached on (571) 272-1828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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